

Comparison of the Test Results of Conventional Concrete with Sulphur-coated Aggregate Concrete

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Abstract Utilizing sulphur in concrete mixes stands out as an exemplary approach to mitigating environmental impacts. This method capitalizes on sulphur as a waste product from industrial operations, addressing waste disposal concerns and promoting environmental preservation. Sulphur concrete exhibits notable qualities, possessing heightened compressive strength, low hydraulic conductivity, and outstanding resistance to water permeation. It proves highly resilient to corrosion, particularly in acidic and saline conditions. Moreover, sulphur concrete boasts enhanced resistance to corrosion, augmenting its durability. When repeatedly loaded, its waterproofing properties prevent it from wearing out, accelerating the hardening process and enhancing its strength. This makes manufacturing more efficient and ensures durability in harsh environments. The objective of the study is to examine the effect of sulphur-coated aggregate concrete on compressive strength, sulphate resistance, and nitrate resistance. The study also aimed to compare the test results of conventional concrete with sulphur-coated aggregate concrete and to investigate the hardened properties of both normal concrete and sulphur-coated aggregate concrete across various cement

percentages, including 5%, 7.5%, and 10%. Examining the compressive strength of concrete using different proportions of sulphur-coated aggregate consistently shows a decline in strength as the sulphur content rises to 5%, 7.5%, and 10%. However, the compressive strength fails to reach the target mean strength, unlike normal concrete. As the sulphur percentage increases, the concrete demonstrates improved performance against these ions. Following exposure to sulphate and nitrate attacks, concrete experiences a substantial reduction in strength, while sulphur-coated aggregate concrete maintains higher strength levels. Notably, the strength of concrete with a 10% sulphur content increases by up to 11.30%. Therefore, the findings indicate that sulphur concrete is suitable for applications in environments with high moisture levels and increased acid exposure. In terms of strength, sulphur concrete shows comparable performance to conventional concrete.

Keywords Comparative Study, Compressive Strength, Durability, Sulphur-coated Concrete, Conventional Concrete
